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End-Results of Tuberculosis of Hip in Children.—So far as repair of tissue and restoration of normal function to the tuberculous hip are concerned, modern local treatment is unsatisfactory. But that does not mean that much cannot be done for the patients, as has been shown by the results of the regimen employed in the Massachusetts Hospital School at Canton. In this institution an intensified hygienic regimen is carried out but with no special emphasis on any one feature except fresh air. During the active stages, bed-traction is employed until pain and muscle spasm subside, when the Bradford splint and a traction splint are substituted. When ambulant, the children engage in the normal activities of their respective ages. They are kept out of doors nearly all of the time at school and play, except in very inclement weather. They are clothed but are exposed to all available sunshine. The regimen maintains the health of the patient at the highest level, and, in general, there is close correspondence between the vitality of the patient and the ultimate condition of the hip. The results speak well for the general hygienic regimen employed. Twenty-two per cent of the patients now have articular surfaces that are likely to be useful as true joints, and one inclines to the idea that this incidence would be higher could the patients be placed under such management during the early stages of the disease. The optimum position for an ankylosis of the hip, for both sitting and walking, is a flexion of from fifteen to twenty-three degrees and slight adduction rather than abduction.—*Tuberculosis of the Hip in Children. A Review of Terminal Results at Canton, L. D. Smith, J. Bone & Joint Surg., July, 1926, viii (old series, xxiv), 636.*—(*H. S. W.*)

Tuberculous Dactylitis in Infancy.—As it is rare to see adults with scars or deformities from tuberculous dactylitis, this study of the end-results of treatment of this condition in infancy was made. Of 1,403 children with surgical tuberculosis, 97 had tuberculous dactylitis (6 per cent). Of these 97 the authors were able to follow up 60. Seven of these were living with adults

known to be suffering from active phthisis. In these instances the infection was probably human. Nearly all the other cases had been fed, in part, at least, on unboiled cows' milk. (The patients were in attendance at the Out Patient Department, Royal Edinburgh Hospital for Sick Children.) The tubercle bacillus, of whichever type, must reach the small bones of the hands or feet by way of the blood. Inasmuch as tuberculous meningitis may be the next manifestation, these cases should be treated with the greatest care. Tuberculous dactylitis is usually multiple. Forty of the 60 cases had multiple bone lesions. The X-ray shows expansion and rarefaction of the entire phalanx or metatarsal. Fourteen of the 60 cases were under one year of age, and 24 between 1 and 2 years. The patients were given local conservative treatment (immobilization by splints), general conservative treatment (diet, codliver oil, heliotherapy), and operative treatment. In this series, 24 cases were operated on. The operations consisted of 10 amputations, 2 subperiosteal resections, and in 12 opening and curetting. Conservative treatment was always used unless the authors were convinced that the disease would cause as much loss of function as the operative interference. Of the 60 cases followed, 29 had more or less serious complications. But though the treatment may often have to be continued for years, the children usually recover.—*Tuberculous Dactylitis in Infancy, G. Herzfeld and M. Tod, Arch. Dis. Child., October, 1926, i, 295.*—(*P. J. W.*)

Diagnosis of Joint Tuberculosis.—It is always desirable to support a clinical diagnosis of tuberculous arthritis by histological proof, but whether biopsy is justifiable solely for the sake of the diagnosis is perhaps open to question. When tissues have been available at operation, as reported in this study, there has been found a wide variation at times between the clinical and the histological diagnosis. Of 135 cases, 70 have been proved to be tuberculosis, by either section or animal inoculation, the former being the more satisfactory. In sections, however, mere "tubercle" with giant cells may not be accepted as evidence of tuberculosis, because such structures may develop about a spicule of bone or other foreign body. The tubercle must be composed of typical epithelioid cells, with or without giant cells or lymphocytes, before diagnosis of tuberculosis is made. The tissue examined in these cases was synovial membrane or other soft tissue removed at biopsy, or bone removed at operation. Study of the latter requires a long time but it is valuable because it has been shown that the tuberculous process usually begins in the bone, and comes to involve the proper articular structures only later. In 8 cases, in which upon examination of the soft parts a diagnosis of syphilis or nontuberculous inflammatory disease was made, the unmistakable diagnosis of tuberculosis was arrived at by examination of the bone histologically. And in 3 cases, in which examination of the soft parts resulted in a diagnosis of a nontuberculous process, animal inoculation proved it to be tuberculosis. But the securing of the soft parts at biopsy is important and when a generous amount is removed the chances of diagnosis are much better. The greatest difficulty in diagnosis by section comes in the cases that have had previous surgical attention or are infected with some other microörganism. The histological picture of healed articular tuberculosis is not sufficiently well known to be of much help in those cases that have been with or without antecedent surgical intervention. In some of these old cases, sections were taken from several areas of bone. Some of these showed tuberculosis while others did not; and it is unlikely that the disease exists solely as a synovial process because of the likelihood of small osseous foci which go undetected. Only 20 of the histologically positive cases were positive upon guinea-pig inoculation, and in 6 instances the report from the examination of the tissues was negative while that from inoculation of guinea pigs was positive. Eight times the animal inoculated died "too soon for diagnosis," and it would appear to be important to inoculate more than one guinea pig. As to the history of the cases, the high incidence of injury prior to onset is significant, as is also the relatively long quiescent period in several of the cases, especially as some of them had been considered cured. It would appear also from the duration of the cases that the bony tissues harbor the disease for a longer time than do the soft parts. The study has shown that, although the X-ray is ordinarily of great aid in the diagnosis, it is possible to have extensive destruction of bone without appreciable evidence of it in the film. Only one case, aside from those with secondary infection and formation of abscess, had a leucocyte count greater than 10,000 or temperature above 100°F. Tuberculin reactions were elicited in 38 cases that were definitely diagnosed tuberculosis and in 14 cases not so diagnosed; they were absent in 5 cases which were definitely positive by tissue examination. A comparison of the clinical with the final diagnosis shows that of 41 cases clinically diagnosed tuberculosis, 66 per cent had a final diagnosis of tubercu-

losis, 24 per cent a final diagnosis of questionable tuberculosis and 10 per cent of nontuberculous disease. Of 52 cases clinically diagnosed as questionable tuberculosis, 27 per cent were found tuberculous, 29 per cent were questionable and 19 per cent were not tuberculous. Of 42 cases with a clinical diagnosis other than tuberculosis, 38 per cent were found finally to have tuberculosis, 7 per cent were questionable and 55 per cent were nontuberculous. In the latter group therefore, biopsy was of great value. Altogether, in the series, 37 operations were done for diagnosis; of these, 50 per cent showed tuberculosis, 18 per cent showed nontuberculous disease and 32 per cent were reported as "no evidence of tuberculosis." This method of study was applied also to joint disease other than tuberculosis and with results that were in the main gratifying.—*Joint Disease. A Clinical-Pathological Study, R. K. Ghormley, J. Bone & Joint Surg., October, 1926, viii (old series, xxiv), 858.*—*(H. S. W.)*

Unusual Cases of Joint Tuberculosis.—Typical changes described in roentgenograms of cases of tuberculous joints are (1) slight periarticular swelling and a suggestion of fluid in the joint cavity, (2) the whole joint becomes slightly hazier than normal and the surfaces of the joint and the epiphyses are not clear cut, and (3) loss of outline of the bone, and a destruction of the cartilage and the bone. Five cases are reported, and from these and a few other similar cases attention has been brought to this one fact, that there is a type of joint tuberculosis which shows deep pockets of destruction of bone, but which also shows very little blurring or fogging of the joint outlines themselves.—*Observations on Some Unusual Cases of Joint Tuberculosis, C. W. Blackett, Am. J. Roentgenol. & Radium Ther., November, 1926, xvi, 427.*—*(W. I. W.)*

Tuberculous Meningitis Following Trauma.—In the traumatic production of miliary tuberculosis and tuberculous meningitis special circumstances must be involved, since latent tuberculosis of the lungs and hilum lymph nodes is frequent, and scarcely a child or youth escapes falls and other injuries accompanied by severe mechanical shaking. We do not know how frequently tubercle bacilli are to be found in the blood-stream of people with latent or concealed tuberculosis. Tubercle bacilli are known to occur in the blood-stream in patients with open pulmonary tuberculosis and there is evidence that their virulence varies greatly. Possibly this varying virulence may be concerned in the occasional production or, on the contrary, failure of production of tuberculous meningitis following trauma. The author tabulates from the reports of others 11 cases of tuberculous meningitis, the symptoms of which developed following an injury. Recovery occurred in one of these cases, the diagnosis having been established, however, by the finding of tubercle bacilli in the spinal fluid. Postmortem examination confirmed the diagnosis in all of the other cases, and usually demonstrated the presence of a caseous lesion elsewhere. In the majority of instances death occurred between 25 and 30 days after the injury. The relation between the trauma and the meningitis in these cases seems fairly clear. Much more difficult are the cases in which a long latent period elapses between the injury and the onset of symptoms. Obviously, injuries permitting the entrance of tubercle bacilli directly into the cerebrospinal fluid, as in cases of cerebral or vertebral tubercle, are most likely to lead to the rapid development of tuberculous meningitis. In several instances recorded, in which the head only was affected by the injury and the primary tuberculosis was in the chest, the relation to the trauma is not so clear. The author reports such a case in a child with caseous bronchial lymph-node tuberculosis who fell, striking the head. The symptoms of meningitis developed immediately afterward. The author queries whether the fall led to the meningitis, or whether a beginning spontaneous meningitis led to the fall. In another case of typical tuberculous meningitis following a severe blow on the head, no primary tubercle could be found in spite of the most careful search at necropsy. The skull was not fractured, nor was the brain injured. In this case it was thought that the severe shaking, occurring when the man fell, might have liberated tubercle bacilli into the blood-stream from some minute focus, but admittedly the case was very obscure.—*Tuberkulöse Meningitis nach Einwirkung stumpfer Gewalt und Körpererschütterung, F. Schultze, München. med. Wchnschr., November 26, 1926, lxxiii, 2009.*—*(E. R. L.)*

Cure of Tuberculous Meningitis in Child.—A 10-year old girl, suffering from tuberculosis of the hip joint and foot, developed tuberculous meningitis with all the typical signs. Tubercle bacilli were found in the spinal fluid, 60 cc. of which were removed by lumbar puncture on the fifth day, and 3 cc. injected intragluteally into the patient. At the same time 1 cc. of a 1 to 1000 dilution of O. T. was injected intralumbar. The child slept peacefully that

night and awoke without meningeal symptoms and with a good appetite. The author is undecided whether the intramuscular injection of spinal fluid or the intralumbar injection of tuberulin was the effective agent, but believes that the spinal fluid was rich in specific antigens. The child made a complete recovery from the meningitis, and five months later was discharged as also clinically cured of the tuberculous coxitis and arthritis of the foot.—*Heilung eines Falles von tuberkulöser Meningitis, O. Wiese, München. med. Wchnschr., November 12, 1926, lxxiii, 1937.*—(*E. R. L.*)

Partial Exclusion in Renal Tuberculosis.—There were found at operation in a case, in which, from the aspect of the pyelogram, the absence of pyuria and the negative animal inoculation, a diagnosis of hydronephrosis had been made, two cystic pockets the size of a hen's egg. These were considered to be ordinary cysts, until microscopic study revealed tubercles in their walls. After nephrectomy further evidence of tuberculosis was found in a cavity at the upper pole. The apparent clinical cure of renal tuberculosis is thus well demonstrated. The inadvisability of partial nephrectomy, even in a case apparently as favorable as this one, is also shown. In the discussion Legueu added that in every kidney removed for tuberculosis there are partial exclusions, which indicate a great effort towards cure. These obliterations may lead to cure by cystic transformation, but if there is mere exclusion, cure is incomplete and operation is necessary. LeFur pointed out that the cure or removal of the principal urinary focus is insufficient for the guarantee of permanent cure. The body itself must be detuberculized by prolonged medical treatment.—*Un cas d'exclusion partielle dans une tuberculose rénale, Michon, Meeting, Congrès français d'urologie, October, 1925, reported in Presse Méd., November 4, 1925, no. 88, 1462.*—(*E. H. K.*)

End-Results of Nephrectomy in Bilateral Renal Tuberculosis.—Of 19 cases, in which nephrectomy had been performed and which had been followed for some time, 7 were dead, one from intercurrent disease, one from pulmonary tuberculosis, 3 from tuberculosis of the remaining kidney, and 2 from renal and pulmonary tuberculosis. Four were apparently cured, one five years and the others four years after operation. Eight were improved, but continued to have tubercle bacilli in the urine. Nephrectomy is not advised when both kidneys are severely or when both are slightly infected, but it is recommended for the severely infected kidney when one is heavily and the other slightly involved. The improvement following this procedure must not be considered as a cure, since at the present time autopsy is the only means of affirming the complete healing of a tuberculous kidney.—*Les résultats éloignés de la néphrectomie dans la tuberculose rénale bilatérale, Thévenow, Meeting, Congrès Français d'Urologie, October, 1925, reported in Presse Méd., November 4th, 1925, no. 88, 1462.*—(*E. H. K.*)

Rare Complications with Renal Tuberculosis.—A patient, with bladder retention of urine, a fistula from a recently incised perineal abscess, and a large, painful left kidney, was found on cystotomy to have a gangrenous, dissecting cystitis. Animal inoculation was positive for tuberculosis, and further questioning revealed a history of hematuria, epididymitis and periurethritis seven or eight years before. Following the gangrenous cystitis the bladder contracted. When renal function was sufficiently good, the left kidney was successfully removed and the stenotic urethra dilated. Bladder capacity was slightly increased.—*Tuberculose rénale accompagnée de complications rares, C. Perrier, Meeting, Congrès Français d'Urologie, October, 1925, reported in Presse Méd., November 4, 1925, no. 88, 1462.*—(*E. H. K.*)

Renal Tuberculosis with Normal Urine.—There is presented a case of renal tuberculosis, characterized only by the presence of tubercle bacilli in the urine and by hematuria. There was no clinical evidence of disease and the urine between periods of hematuria was entirely clear.—*Tuberculose rénale et urines claires, Utréan, meeting, Congrès français d'Urologie, October, 1925, reported in Presse Méd., November 4, 1925, no. 88, 1461.*—(*E. H. K.*)

False Cure of Renal Tuberculosis.—A case is presented in which the blocking off of the tuberculous portions of an infected kidney by a fibrous barrier led to the diagnosis of spontaneous cure. Function was diminished in this kidney, but the urine contained neither albumen nor pus. Pyelography, however, revealed the upper calyx distorted, and dissection of the organ after nephrectomy disclosed tuberculous cavities completely separated from the calyx by a fibrous barrier.—*Pseudo-guérison d'une tuberculeuse rénale par exclusion partielle, Wildbolz, Meeting, Congrès Français d'Urologie, October, 1925, reported in Presse Méd., November 4, 1925, no. 88, 1462.*—(*E. H. K.*)

Renal Tuberculosis.—When the classical symptoms of renal tuberculosis are

absent the diagnosis becomes rather difficult. Hobb's statistics are of interest: At the necropsy of 143 patients with advanced pulmonary tuberculosis, involvement of the kidneys could be detected macroscopically in 55 per cent, although few had any symptoms of renal tuberculosis during life. In 3,766 other cases of pulmonary tuberculosis reported by various observers kidney involvement was found macroscopically at necropsy in a little more than 15.5 per cent. Tubercle bacilli were found in the urine of more than 8 per cent of 422 patients suffering from pulmonary tuberculosis, but with no other symptoms referable to the urinary tract. Functional kidney tests are of value in determining whether or not renal tuberculosis is present and whether it is unilateral or bilateral. Tuberculosis of the kidney is comparatively uncommon in patients under 18 years of age. In 1,082 cases reported by different writers in which the age was stated, only 6, or a little more than 0.5 per cent, occurred in children under 11 years of age. *Conclusions:* The urine does not always contain tubercle bacilli, notwithstanding the presence of a tuberculous infection of the kidney, nor do these microörganisms in the bladder or even in the kidney urine necessarily indicate renal involvement. Tuberculosis of the kidney is frequently associated with active pulmonary tuberculosis. Some strains of tubercle bacilli may be pathogenic for man but not for the guinea pig. Repeated examinations of the urine by means of smears and guinea-pig inoculations are sometimes necessary before the tubercle bacilli are found. The roentgenographic observations in renal tuberculosis are positive in a much larger number of cases than is generally appreciated, and this procedure should be more frequently employed in diagnosis. Tuberculosis of the kidney occurs more frequently in children than is indicated by most of the statistics appearing in the literature, and modern urological diagnostic procedures, such as cystoscopy, ureteral catheterization, functional kidney tests and pyeloureterography, are frequently indicated in infants and children as well as in adults. Renal tuberculosis is uncommon as a complication of pregnancy, although it is probably often overlooked.—*The Diagnosis of Renal Tuberculosis, W. E. Stevens, J. Am. M. Ass., January 8, 1927, lxxviii, 71.*—(*W. I. W.*)

Renal Infection in Pulmonary Tuberculosis.—The extensive destruction of renal tissue usually found in so called primary renal tuberculosis has led to the belief that tuberculosis of the kidney is a progressively destructive lesion which does not heal. On account of this it is now a common practice, whenever tubercle bacilli are found in one ureteral urine and not the other, to remove the kidney excreting bacilli regardless of the size of the lesion. The truth or falsity of the belief that renal tuberculosis does not heal is the main consideration of this paper. It was realized that to detect the presence of healing, other than advanced cases of renal tuberculosis (renal phthisis) should be studied. With this consideration in mind, kidneys from patients dying of pulmonary tuberculosis or its complications, but giving no clinical symptoms of renal involvement, were studied. No cases of renal phthisis (cavitation) were included. From 30 patients, 44 kidneys were examined; both kidneys in 14 of the cases, in the remainder only one kidney being available. The ages ranged from eighteen months to seventy years. The kidneys were examined macroscopically and portions of the kidney tissue which appeared abnormal were cut out for microscopic study. When definite tuberculous lesions were numerous, the smaller lesions only were saved. All areas where there was a depression in the kidney surface were also saved for histological examination. The blocks of tissue were embedded in paraffine and serial sections made. Every third slide was stained for tubercle bacilli by Verhoeff's carbol-fuchsin. The remainder of the sections were stained with hematoxylin and eosin. Approximately 100,000 sections were carefully examined. In some lesions the bacilli were so scarce that but one bacillus could be found in ten sections, whereas in other lesions a single section would show hundreds of microörganisms. In all, 367 definite tuberculous lesions were studied, varying from small tuberculous abscesses to lesions in which the only evidence of their tuberculous nature was the presence of an occasional giant cell or of a microscopic mononuclear-cell tubercle. Tubercle bacilli were found in 265 of these lesions. Many of the small lesions were not stained for tubercle bacilli. The distribution of the lesions within the kidney tissue was as follows: 75 per cent were cortical, 11 per cent medullary and 13 per cent corticomedullary. To study the point of origin, the smaller or microscopic lesions were chosen. These were of two main types. The most common was of vascular origin within the capillary tuft of a glomerulus, within a capillary between the convoluted tubules, or within a capillary between the collecting tubules in the pyramids, in that order of their frequency. The second type had its origin within the lumina of the tubules. They always subtended an ulcerating tuberculous lesion in

some portion of the kidney substance. It appears that this type of lesion is always secondary to a vascular lesion, which has developed to a point where destruction of tissue has supervened and tubercle bacilli have been discharged into the lumen of the tube. In a considerable portion of probably healed tuberculous lesions it is impossible to find anything which would label it as positively tuberculous in nature. The healed lesions of infections other than tuberculosis leave scars which are impossible to distinguish from healed tuberculous lesions in which caseation had been absent or at most was scanty. Scars occurring in kidneys where there was evidence of arteriosclerosis were disregarded. Of the 30 cases studied, two showed no tuberculous lesions or scars. In 24 cases, definite tuberculous lesions were found and 14 of these also showed scars. The remaining 6 cases showed scars only. The following was the distribution of 100 of the scars: cortical, 80; medullary, 14; and corticomedullary, 6. It will be seen that the scars were distributed in the different renal regions in approximately the same proportion as were the active lesions. The size of the scars varied considerably and all showed more or less destruction of kidney tissue. Lymphocytic infiltration varied from none at all to marked. The majority of the scars showed rather a loose connective tissue. In all the larger lesions some normal kidney tissue was present within the scarred area. Two of the 14 cases in which both kidneys were examined were entirely negative. One case showed only scars in both kidneys. In several cases the lesions were larger in one kidney than in the other. As a control to the above series, the kidneys from 22 necropsies on nontuberculous individuals were examined by the same technique, although serial sections were not done. The lesions observed were arteriosclerotic scars, 7; infarcts, 2; chronic glomerulonephritis, 1; acute infectious nephritis with abscess formation, 5; small cortical scars, 2 (endocarditis); fibroma, 1; papillary adenoma, 2; and negative, 8. From this study it appears that the tuberculous lesion in the kidney does not differ from that in other organs and tissues of the body, provided the differences in histological and anatomical structure are borne in mind. As far as can be determined, the same types of cells participate in the defensive and reparative processes of the tuberculous lesion in all tissues and organs. It was not uncommon to find a great variety of tuberculous lesions in a single kidney. Mononuclear-cell tubercles, tuberculous abscesses, areas of caseation, scarred areas infiltrated with lymphocytes and with from one to many giant cells present, and scars devoid of lymphocytic or mononuclear leucocytic infiltration, have all been observed in one organ. From this it would appear that the individual had had, at intervals, showers of tubercle bacilli in the bloodstream and that these showers have been followed by the development of tuberculous lesions in the kidney. These are of different age and severity, and the scars represent the healed state in an area where the tubercle bacilli have been successfully overcome. The fact that, out of 22 cases with definite tuberculous lesions, 12 with no evidence of arteriosclerosis showed scars, whereas out of 20 nontuberculous cases, in only two with no evidence of arteriosclerosis were scars found, leads one to the logical conclusion that at least a portion of these scars, and in all probability a goodly portion, represent healed tuberculous lesions. A fact of some surprise was that none of the cases presented clinical manifestations pointing toward renal involvement. A study of the urine for tubercle bacilli was not made. Others have reported the presence of renal tuberculosis with bacilluria without clinical manifestations. By some it is believed that bacilluria is at times encountered in the absence of kidney lesions. The author does not subscribe to this, but states that "excreting bacilluria" does not exist without ulcerative tuberculous lesions in the kidney. Judging by the absence of inflammatory exudate and bacilli in the lumina of the tubules, at least one-half of the cases in this series would not have shown tubercle bacilli in the urine. Apparently renal tuberculosis can exist without bacilluria being present. The common occurrence of tuberculous lesions in the kidney in cases of pulmonary tuberculosis was unexpected. This report shows a very high percentage (73 per cent). Every case of progressive pulmonary tuberculosis is a potential candidate for renal infection. The renal lesions are secondary to some other tuberculous focus, usually pulmonary, in the body, and the infection is hematogenous. The latter fact is indicated by the preponderance of cortical lesions. The reason for no recorded cases of healed renal tuberculosis is that the majority of cases studied have been of renal phthisis, and that, when tuberculosis of the kidney has been observed in the routine of a necropsy, its occurrence has been automatically recorded without a thorough systematic study of the kidney for healed lesions. Renal phthisis is an advanced progressive lesion. Healing of an excavated kidney probably does not occur. Such lesions, however, under suitable conditions may be clinically arrested. The following pathological facts are emphasized: The presence of tubercle in ureteral urine

establishes the diagnosis of renal tuberculosis but not of renal phthisis. The absence of tubercle bacilli in the urine does not rule out renal tuberculosis. Tuberculosis of the kidney is of hematogenous origin, and when it occurs (as far as this study goes) it is always bilateral. Seventy-five per cent of the lesions are cortical. Tuberculous lesions of the kidney heal, and can exist without clinical manifestations. The following facts should be established before nephrectomy for renal tuberculosis is undertaken: 1. Evidence of considerable destruction and cavitation of the kidney. 2. The presence of tubercle bacilli in the urine on several examinations. 3. The absence of tubercle bacilli in the urine from the opposite kidney. 4. The failure of treatment on the same basis as for pulmonary tuberculosis to arrest the condition.—*Cases of Renal Infection in Pulmonary Tuberculosis: Evidence of Healed Tuberculous Lesions, E. M. Medlar, Am. J. Path., September, 1926, ii, 4011.*—(*J. S. W.*)

Adrenal Tuberculosis with Involvement of Stomach.—A man previously in good health was suddenly taken ill with a chill, vomiting and pain in the abdomen of such character as to lead to the diagnosis of ulcer of the stomach. The systolic blood-pressure at this time was 100. Under treatment he rapidly improved and apparently returned to normal health. A year later he again became acutely ill with the same symptom complex. At this time the blood pressure was 85. He died in 48 hours. At necropsy bilateral fibrocaseous tuberculosis of the suprarenal glands was found. The left suprarenal was adherent to the stomach, and on the mucous surface of the latter, corresponding to the site of the adhesion was an ulcer with a floor formed of tuberculous granulation tissue. Accessory cortical suprarenal tissue was found in the solar plexus. The healing, granulating margin of the gastric ulcer suggested strongly that the ulcer was the result of a perforation from the diseased left suprarenal at the time of the patient's severe symptoms a year previously. The accessory cortical suprarenal tissue and probable presence of medullary substance in the neighboring ganglia were considered adequate explanation for the absence of the typical signs of Addison's disease. In this case there was a definite increased pigmentation of the face, but the pigmentation of the rest of the body was normal.—*Nebennierentuberkulose mit Durchbruch in den Magen, M. Nordmann, München. med. Wchnschr., December 10, 1926, lxxiii, 2123.*—(*E. R. L.*)

Late Results of Epididymectomy in Genital Tuberculosis.—A study was made of 145 cases of genital tuberculosis from Hartmann's clinic. Of this number 44 occurred between the ages of twenty-one and thirty, and 38 between thirty-one and forty. In 92 cases there was clinical involvement of the prostate alone in 32, of the seminal vesicles in 8, of the epididymis alone in 25, and of the prostate, vesicles and epididymis at one time in twenty-seven. In the group of 145 cases, there were done, according to the needs of the case, 48 castrations, 5 incisions or incisions with curettage or ignipuncture, and 92 epididymectomies. Study was made of 25 of this last group, two months to twenty-three years after operation, with a majority after two to four years. Three had died, one of appendicitis, one of pleurisy, and one of cachexia associated with a tuberculous knee-joint. There was in the remaining 22 no mental disturbance, which is such a frequent sequel of castration. The external appearance was normal, and there was no testicular atrophy. Epididymectomy may cause a retrogression of disease elsewhere, as in the prostate and seminal vesicles, when all these organs are involved. A definite cure may be obtained if there is no testicular infection, and, even when the microscope might reveal such invasion, results are satisfactory. These good late results, therefore, make epididymectomy, rather than castration, the operation of choice whenever possible in genital tuberculosis, especially since the internal secretion of the testicle is thus retained, and many psychoses are averted. The incision is made above the lesion, the tunica vaginalis is opened, and the epididymis and testicle are explored directly. If there is a fistula, the involved area, including skin, is removed in one piece.—*Les résultats éloignés de l'epididymectomie dans la tuberculose génitale N. Barbilian, Presse Méd., November 4, 1925, no. 88, 1460.*—(*E. H. K.*)

Changes in Testicles in Pulmonary Tuberculosis.—The testes of 80 men, of different ages and dying of pulmonary tuberculosis, were examined, 75 per cent of the men being around the age of 40 years. In only one case was a definite connective-tissue overgrowth noticed macroscopically. All the rest showed no macroscopic changes. In all the cases examined changes were found microscopically, affecting the parenchymatous as well as the interstitial tissues, with a narrowing of the lumina of the tubules, and in many cases a complete occlusion resulted from thickening and hyalinization of the membrana propria. The epithelium

of the tubules showed atrophic changes, and the number of cells was diminished. These changes are believed to have resulted from tuberculotoxemia. It is also pointed out that not only tuberculosis, but other chronic and acute infections and intoxications as well as cachectic conditions, malignant tumors, X-ray and radium rays, can cause similar changes. The histological picture resembles that seen in alcoholism. This finding throws light upon the inheritance of a predisposition to tuberculosis.—*Pathologisch-anatomische Veränderungen in den Hoden bei der Lungentuberkulose, W. J. Roschdestwensky, Beitr. z. Klin. d. Tuberk., 1926, lxiii, 138.*—(*H. J. C.*)

Treatment of Tuberculosis of Skin with Pyotropin.—A case of severe disseminated lupus in a child was favorably influenced by means of pyotropin, and the same substance was used in 22 other cases, 16 of which were clinically improved and 1 apparently improved, and 5 are still under treatment. Besides the local treatment, light, air and tuberculin were also used.—*Die Behandlung der Hauttuberkulose durch Kombination von Licht und Pyotropin, H. Schneider, Ztschr. f. Tuberk., 1926, xliv, 430.*—(*H. J. C.*)

Tuberculomata of Skin.—The histopathology of superficial tuberculosis is characteristic but not pathognomonic, for sporotrichosis, syphilis, leprosy, actinomycosis and other infectious granulomata produce similar tissue reactions. Nor does the search for tubercle bacilli always disclose the nature of the disease, because frequently bacilli cannot be found and, also in such morbid tissue, nonpathogenic acid-fast bacteria may occasionally be present. Inoculation of animals with the tissue necessitates a wait of six weeks for final diagnosis, and even then animals may not show tuberculosis when but few or attenuated bacilli have been inoculated. Frequently, too, animals in which a piece of the diseased tissue is implanted subcutaneously will develop tuberculosis, while animals inoculated with an emulsion of the same tissue remain normal. Reliance upon the tuberculin test helps a good deal. It is now known that there are several types of cutaneous tuberculosis, such as lupus vulgaris (eight or ten forms), scrofuloderma, *tuberculosis cutis verrucosa, tuberculosis cutis miliaris*, tuberculous tumors, tuberculides, etc. Frequently, in the cutaneous disease which clinically may be either tuberculosis or syphilis, failure to improve after antisyphilitic therapy aids greatly in arriving at the diagnosis. Tuberculous tumors of the skin very commonly resemble syphilis. Fibromatous, polypoid, lymphangiomatous, hemangiomatous forms have been classified. They may be as large as a hazel-nut, and may be local or disseminated. There are many types that are difficult or impossible of diagnosis; some of them called tuberculosis by one author are not so designated by another.—*Ueber tuberkulöse Hauttumoren, W. Richter, Deutsche med. Wchnschr., October 1 and 8, 1926, lii, 1675 & 1725.*—(*H. S. W.*)

Opening Wards of General Hospital to Surgically Treated Consumptives.—The gratifying results from thoracoplasty in far-advanced cases of pulmonary tuberculosis have created the desire to give the benefit of such surgical treatment to the consumptive poor as well as the rich. However, in the state of New York a serious obstacle has been met with in the law which forbids the admission of tuberculous (pulmonary ?) patients to the surgical wards of the general hospital. This law was enacted some years ago on the recommendation of the State Board of Charities. To ascertain the opinion of leading tuberculosis specialists and sanitarians with regard to this state of affairs the following query was sent to them, "Does any danger arise to patients suffering from other diseases when a tuberculous patient, who has been operated on by means of extrapleural thoracoplasty, for rib resection or cutting or avulsion of the phrenic nerve, is placed in a corner of a surgical ward of a general hospital?" Many replies were received, practically all those answering stating their disbelief in the idea that the presence of a patient having undergone thoracoplasty or other similar operations is a menace to the other patients, provided the proper sanitary precautions are carried out. The only other States besides New York reporting laws prohibiting the tuberculosis patient from the surgical wards are Illinois, Minnesota and Virginia; also the District of Columbia. As a result of the efforts of interested persons the New York State Board of Charities has recently (April 21, 1926) modified the original law, and the surgical wards of general hospitals are now permitted to receive tuberculosis patients on whom thoracoplasty has been performed. The balance of the article is devoted to what can be done from a medical point of view to give these patients the best possible care in coöperation with the surgeon. Following the operation, the practice of the author's so called "controlled diaphragmatic breathing" is urged and the *modus operandi* of this is described in some detail. The author's hydrotherapeutic measures are also mentioned.—*The Placing of Thoracoplastic Cases*

in General Surgical Wards and Their Medical Care Thereafter, S. A. Knopf, Med. J. & Rec., June 2 and 16, 1926, cxxiii, 715 & 787.—(J. S. W.)

Treatment of Tuberculosis.—Success in the treatment of tuberculosis cannot be accurately gauged by statistics as they are now compiled. Many patients leave the sanatorium before they should, and data based on the results of their treatment while in the sanatorium are obviously misleading. Such information merely reveals the degree with which the problems of the individual are being met rather than the curability of his particular case of tuberculosis. Adequate treatment, as in all other diseases, is the only logical basis for statistics concerning curability. The prerequisite to such treatment is a sufficient knowledge of the tuberculous process and its effect on physiologic equilibrium. For the sake of cooperation, the patient himself should be made acquainted with the nature of his disease, and the objects and rationale of treatment. He is more apt to successfully combat his disease if physiological equilibrium is approximated. This requires treating the patient rather than the pathological processes. There are great variations in physiological reserve, and these personal factors should be recognized in practice. As to therapy, the usual recognized measures are briefly mentioned. They can be most effectively applied wherever the individual is best relieved of financial and domestic worries. This is usually in a sanatorium.—*Treatment of Tuberculosis, F. M. Pottenger, Ann. Clin. Med., November, 1926, v, 492.—(R. S. A.)*

Remedies for Tuberculosis.—All of the tuberculins were found to be of little or no value, and indeed very dangerous if carelessly used. Spengler's I. K., sodium morrhuate, pneumosin, nascent iodine, *angiolymphe*, *collosol*, calcium, creosote, guaiacol, allyl compounds, gold compounds such as "sanocrysin," popular remedies such as *tuberculozyme* and *gomelon* were all found of no real therapeutic value after rather extensive trial. Probably in a few cases the physiological effect of one or more of the above remedies was of some little value for a short while, but no lasting results were obtained. Codliver oil seems to be beneficial in children suffering from undernutrition and hilum tuberculosis. Autogenous vaccines were found to be apparently of some value in secondary infections, particularly in bronchitis and asthmatics with a tuberculosis. The two methods of treatment most relied upon to give the best results are sanatorium treatment and artificial pneumothorax. It is suggested that the key to the most successful treatment probably will lie in the discovery of any factors which increase or decrease resistance to the activities of the tubercle bacillus in the human species. Until more is known the greatest hope lies in prevention and early diagnosis.—*Personal Experience with Various Remedies Used in the Treatment of Tuberculosis, A. N. Robertson, Brit. J. Tuberc., July, 1926, xx, no. 3, 111.—(H. McL. R.)*

Rest in Pulmonary Tuberculosis.—This paper, presented in two successive monthly installments, embraces methods conducive to general and localized rest in pulmonary tuberculosis. Regard for the psychic element in the handling of the patients is suggested with some detail. Persons with tuberculosis are not essentially abnormal in their psychic reactions. Their disease requires both mental and physical rest. The second portion of the paper is principally concerned with the condensed description of various apparatus and technique used to secure complete or modified rest of the whole or portion of one lung. Artificial pneumothorax, extrapleural thoracoplasty, and other surgical procedures, are conservatively recommended when other methods have apparently failed. Considerable description is given to the origin and *modus operandi* of Knopf's method of limiting respiratory movements and their frequency by diaphragmatic breathing. Miscellaneous testimony in support of the method is presented.—*Mental and Physical Rest in Pulmonary Tuberculosis, S. A. Knopf, Med. J. & Rec., December 1, 1926, cxxiv, 665; December 15, 1926, cxxiv, 748.—(R. S. A.)*

Salvarsan and Pulmonary Tuberculosis.—The recommendation of Raffauf and Lentrodt, of giving salvarsan in all productive forms of pulmonary tuberculosis for the treatment of a coincident syphilis, cannot be accepted without reservations. A case is reported, in which silver-salvarsan was used for treating a syphilitic infection, and in which after the third injection there was pronounced pyrexia and tubercle bacilli appeared in the sputum? The clinical symptoms became aggravated, thus transforming a favorable pulmonary process into a predominantly progressive type. Since, however, there occur open cases of extensive tuberculosis, in which a combined salvarsan-gomenol treatment is well tolerated, it is believed that there must be a strict individualization in such treatment. In conclusion, a case of pulmonary gangrene is re-

ported, which was treated with neosalvarsan, with a drop in the temperature, increase in body-weight and marked improvement. The patient died nine months later of cardiac insufficiency, and a cavity was found, which had become completely evacuated. A trial of salvarsan treatment is recommended in cases of chronic pulmonary gangrene.—*Salvarsan und Lungentuberkulose (mit einem Beitrag zur Behandlung der Lungengangrän), W. Landau, Beitr. z. Klin. d. Tuberk., 1926, lxiii, 373.*—(*H. J. C.*)

Treatment of Hemoptysis.—There are three groups of causes of bleeding from the lungs, namely, disease of the vessel walls, pressure conditions in the lesser circulation and individual idiosyncrasy. In the first instance there is pulmonary tuberculosis, especially in the early and again in the rapidly caseous and excavating cases. In the second there are the shape of the chest, the hindrance to circulation from old tuberculous scars or pleural effusions, from bronchiectasis, or from shallow breathing which will increase an already existing congestion. Sudden increases in pressure from coughing may lead to bleeding. Occupation (hemorrhage is more common in men) and atheromatous conditions of the vessels are likewise causes. Atmospheric pressure, especially changes of pressure, are of importance. In the third group, psychic irritation and "habitual" bleeding in patients who are not hemophiliacs have an influence on the incidence of pulmonary bleeding. Dangerous or fatal hemoptysis is uncommon. The chief danger from hemorrhage is the pulmonary retention of the blood. In treatment the vasoconstrictor drugs have very little to recommend them. Those which increase the coagulability of the blood help to some extent. Many drugs have been advocated, with claims of success in stopping hemorrhage, but this has come about in all likelihood because most hemorrhages tend to cease spontaneously. The first essential in treatment is to allay apprehension and quiet the patient, who must be told that the hemorrhage itself is not serious but that he should expectorate the blood. He should assume the posture that is most comfortable. Strapping the affected side is of no value. Examination should be done only with great care, for sometimes it enables one to localize the side of the bleeding. When blood comes from the lower or right middle lobes the upright position removes congestion in the part and frequently stops the bleeding. The patient may continue his usual diet, which should be a moderately warm one. Other diseases of the lungs (and heart) that may cause bleeding are pneumonia, infarction, poisoning, cirrhosis, bronchiectasis, abscess, gangrene, syphilis, cancer, myotic infection, mitral lesions and sclerosis of the blood-vessels.—*Behandlung der Lungunblutung, H. Grau, Deutsche med. Wchnschr., January 21, 1927, lii, 150.*—(*H. S. W.*)

Efficacy and Standardization of Hemostatics.—During the last two decades the use of organic extracts and of sera to arrest obstinate hemorrhage has gained prominence in practice, but no unanimity exists as to their comparative value, while laboratory experiments by different observers are contradictory. An examination of previous experimental methods employed reveals the causes of the varying results. *Essentials in Standardization:* 1. No substance should be present other than the hemostatic which acts chemically or physically on blood. 2. No substance should be removed from the blood. 3. The blood should be uncontaminated by tissue juices. 4. It should remain fluid long enough to observe the effects of the hemostatic. Also, the hemostatic should be studied at different temperatures and concentrations. *Methods Employed:* Paraffined cannulas and containers were used because they keep the blood fluid at room temperature for at least an hour under ordinary conditions. At 37.5°C. it remains fluid 13 to 15 minutes. Cat's blood was used, as it reacts better than that of the dog or rabbit. Both the local and the internal action of the various hemostatics were studied. In the former case 0.25 cc. of the hemostatic in dilution recorded was added directly to the fresh arterial blood in paraffined tubes; in the latter, 1 cc. of the blood was first obtained as a control and, after an appropriate time following administration of the hemostatic, the procedure was repeated. *Results:* Locally, the most marked results were obtained with *protogulin* (thrombin) and with *thromboplastin* (extract of brain tissue). Internally *fibrogen* (tissue fibrinogen), dose 0.5 cc. intramuscularly, and sodium citrate, 5 cc. of a 10 per cent solution also given intramuscularly were most effective, shortening the coagulation time to between 5 to 6 minutes. Next came *thromboplastin* in 7.5 cc. doses intravenously, and *hemoplastin*, in 0.25 cc. doses intravenously (between 7 and 8 minutes). *Conclusions:* Each of the newer hemostatics accelerated the clotting of pure blood *in vitro.* Preparations, apparently inert at room temperature (17°C.), are active at body temperature (37.5°). Some of the preparations showed greater coagulating action in higher than lower dilutions, notably *cephalin.* The experimental results here recorded agree generally with clinical ob-

servations but are at variance with tests done on oxalated and citrated blood.—*The Efficacy and Standardization of Haemostatics, J. W. Pickering and A. Hemingway, Brit. M. J., June 19, 1926, no. 3415, 1029.—(A. P.)*

Treatment of Spontaneous Pneumothorax.—A case of left-sided, almost complete spontaneous pneumothorax is reported, in which there was no infection of the pleura. It is recommended that in such cases refills be made with slight positive pressure, using the precaution, however, of attending carefully to the condition on the other side. Thus the pneumothorax is kept dry.—*Zur Therapie des tuberkulösen Spontan-Pneumothorax. (Kasuistischer Beitrag.), E. Werner, Beitr. z. Klin. d. Tuberk., 1926, lxiii, 379.—(H. J. C.)*

Treatment of Tuberculosis during Pregnancy.—The interruption of pregnancy in tuberculosis is valueless and unnecessary. In a separate division of the clinic tuberculous pregnant women are treated for a long time. The results have been very satisfactory, although the number of cases reported is small, since physicians usually send tuberculous pregnant women to gynecologists who prefer to interfere operatively.—*Phthiseotherapie bei Schwangeren und Wöchnerinnen, C. Menge, Centralbl. f. Gynaekol., 1926, l, 921.—(H. J. C.)*

Present Outlook of Voluntary Sanatoria in England.—Prior to 1910 treatment for pulmonary tuberculosis was accorded in sanatoria endowed by public subscription or private beneficence and in privately equipped and conducted institutions for better-class patients. In 1910 legislation was enacted, empowering the local authorities to bear the entire cost of patients from public funds. This was the cause of a marked reduction in charitable funds. A comparison of the cost per patient in the voluntary or privately owned institutions and in the publicly owned ones reveals that the cost per patient-week is greater in the latter. One fact is clear from the statistics, namely, voluntary management can compete successfully with publicly conducted sanatoria, with smaller cost to the State. Most of the voluntary institutions are in a sound financial condition and are enjoying surplus funds. In view of this condition it is suggested that a portion of this surplus fund be used for the purpose of expansion to meet the growing exigencies without having recourse to the full government grant of 50 per cent. It is also pointed out that the disappearance of the voluntary sanatorium would mean a complete loss of a large amount of charity and its attendant interest in the fight against tuberculosis. It also appears that the patients if given a choice prefer the voluntary sanatorium with its freedom from bureaucracy.—*The Present Outlook of the Voluntary Sanatorium, A. Adams, Brit. J. Tuberc., July, 1926, xx, 101.—(H. McL. R.)*

Functions of Tuberculosis Dispensary.—The establishment of the tuberculosis dispensary was a reaction away from the ineffectiveness of the out-patient department of the past. Formerly the victim of tuberculosis was expected to die, and treatment was empirical, unphysiological and usually futile. Life was rarely prolonged beyond the limit of two years allotted by Laennec and Louis as the average duration of a consumptive's life. Apart from a few hospitals the chief care for the poorer citizens forty years ago was through out-patient departments. Such care consisted of a hurried examination for the presence of recognized signs of chest disease; when these were present the patient was usually given a prescription for his cough and for codliver oil. Occasionally he was admitted to the hospital for a relatively short time. There was little hope or effort to ensure more than amelioration or arrest of existing symptoms. Such treatment disregarded the natural history of the disease, its infectious origin, its widespread distribution, its course, its protean manifestations, and its dependence on environmental conditions. The functions of the tuberculosis dispensary are of a much wider scope than those of the antiquated out-patient department. The former consist chiefly of a receiving house for diagnosis, a clearing-house and centre for observation, a centre for curative treatment and supervision of ambulant cases, a centre for contacts, a centre for "after-care," and an information-bureau and educational centre. After a test of forty years some of the more conspicuous developments and larger results of the tuberculosis dispensary may be cited. It has collected living proof of the universality of tuberculosis throughout the community. It has thrown light on the influence of environment as a factor in the production of tuberculosis. It has afforded evidence of the spread of the disease throughout a household. It has determined the frequency with which tuberculosis is contracted in childhood. Its investigations have largely disproved the doctrine of heredity. The tuberculous mother rarely produces offspring already tainted by tuberculosis, and the offspring of such a mother is

saved the risk of infection from the mother in proportion as it is protected by separation from her. Tuberculosis is thus seen to be essentially a household disease because of the opportunities afforded for the transmission of infection, and the risk exists in great degree in early childhood. The dispensary has afforded opportunity for early detection of infection. It has shed new light concerning the natural history of tuberculosis by observing the same patients over an extended period. It has shown that in a majority of cases there is a gradual extension of the disease. Observations have also reached the ebb and flow in the progress of the infection throughout a long life. Patients with cavity may live and carry on a moderate amount of work for thirty years or longer. It has been made very clear that prolonged supervision is essential and that short periods of residential treatment are often valueless. These examples are recorded merely as a few illustrations of the activities of the tuberculosis dispensary.—*The Actual Place and Function of the Tuberculosis Dispensary in the Tuberculosis Scheme, R. Philip, Brit. M. J., July 10, 1926, no. 3418, 55.*—(*H. McL. R.*)

Climate of Alps in Summer and Winter.—For forty or fifty years it has been known that mountain climate benefits some types of patients with pulmonary tuberculosis. In former years all types of patients were sent to the mountains, but it has been found that the very debilitated in an advanced stage, with caseation and softening, do not do well. The important features of the Alpine climate in Davos may be summed up briefly as follows: sheltered elevated valley climate, with low atmospheric pressure, small amount of cloudiness, freedom from fog, cold dry air, freedom from dust and microbes, and a high degree of insolation and radiation. The physiological effect of low atmospheric pressure is the stimulation of increased breathing and blood-formation. The maximum cloudiness occurs in summer, the minimum in winter. However, in summer the sun is richest in the most important rays from a biological point of view, the ultraviolet. In July the sun is but little hotter than in January, but is ten times as rich in the ultraviolet rays. That climate which produces the greatest stimulation with the greatest conservation of energy seems to be associated with the high altitudes of the temperate zone. In such climates all have a very active therapeutic agent if applied properly. It is emphasized that "the climate features often most favorable to the organism as a whole may lack the qualities most favorable to the morbid local condition." The reacting power seems more active in the young, and it is therefore the young and middle-aged who do best in mountain climate. The climate in the Alps is equally good in summer and winter. It is believed that much better and lasting results could be obtained if patients would remain in such climates one to one and a half years, instead of the usual three to six months. It is apparent that the old practical experience of the healing effect of the higher altitudes has gained its scientific explanation through the results of researches of recent years.—*The Alpine Climate in Summer and Winter, C. Dorno and B. Hudson, Brit. J. Tuberc., July, 1926, xx, no. 3, 116.*—(*H. McL. R.*)

After-Care of Tuberculosis.—The exercise period, allowed a patient to equip him for a return to a life of at least limited productiveness, following the process of repair of his lesion, is the most highly individualized, most important, and most dangerous period of the cure. It deserves the most careful supervision, and calls for the most mature judgment, in order to determine the rate of increase of exercise, and to establish the limitations within which the patient must live afterward. While the most important stages of repair take place during the rest period of his treatment, injudicious exercise will set the result of his previous treatment at naught. There is a parallelism between the conduct of the exercise period and the administration of tuberculin, inasmuch as resulting manifestations may be similar. Just as a large dose of tuberculin brings about a general reaction, so does an unusual increase in exertion; while small increases may bring about focal reactions only. Just as we regulate the dosage of tuberculin to avoid general reactions and minimize focal reactions, so must the patient's exercise be regulated. For him excessive effort produces an autoinoculation, manifested by focal reactions, then general reactions, and, finally, reactivation of his quiescent lesion. To minimize this danger in the regulation of exercise, the physician should accustom himself to the frequent auscultation of the "critical areas" and the "advancing borders" in the lungs; that is, of the borderland of diseased and relatively healthy lung. With practice, slight changes in these areas may warn one that exercise is being overdone. Even after the patient is being permitted as much as an hour's walking twice a day, an addition of ten minutes to each period will often be followed by recognizable changes in the lung. Therefore, during the exercise period, "toxin" tolerance should be

established. While an effort rating of three hours' exercise may demonstrate a patient's ability to return to a productive life, reactions are seen so frequently after the addition of only fifteen minutes to this period as to convince one that, as a general rule, the patient is safe only so long as he stays inside, and does not exceed his effort rating.—*The Care of the Tuberculous Patient After the Rest Period, W. L. Dunn, Tubercle, February, 1927, v, 223.*—(*G. L. L.*)

Boston Placement Committee in Rehabilitation of Arrested Tuberculosis Patients.—Rehabilitation in tuberculosis simply means getting the consumptive back on the job, but it is in fact a difficult task. The problem must be met intelligently if high standards are to be maintained. Massachusetts spends annually millions of dollars to maintain sanatoria, clinics, etc., and Boston alone over $300,000 annually on tuberculosis work there. But medical and curative treatment must be supplemented by after-care, and the medical profession should be pioneers in this work. Patients should be urged to return to their physicians for examination and advice, and their working conditions should be carefully investigated. Finally, the situation should be explained to the employer. One method of solution, the farm and industrial colony, is of limited scope. Among the earliest were those at Papworth, England, and Rutland, Massachusetts. The products of Papworth are sold in the open market. Special shops or workrooms also fill a need, among which may be mentioned the Altro Work Shop in New York City, very successfully conducted under the management of the Jewish Charities. Two years ago the Boston Tuberculosis Association appointed a Placement Committee with Hawes as Chairman and Mrs. Anna Wright as Field Secretary. The objects sought have been as follows: (1) To persuade hospitals and sanatoria to introduce a system of prevocational training, under which no patient would leave without his physical and mental ability to work having been tested. (2) To be in a position to assure employers and others interested that there will be constant and efficient medical supervision. The Association plans soon to have its own clinic and physicians to whom all applicants for positions must report regularly. (3) There must be some means of tiding the patient and his family over the earlier weeks of employment or until he becomes self supporting and this requires close coöperation with official and unofficial social agencies. (4) It is hoped to establish pre-industrial training in affiliation with shops for the handicapped already existing in Boston. Every tuberculosis institution in Massachusetts should have an occupational therapy department and prevocational training school. At present there is close coöperation with the colony at Rutland under Bowditch and Crane, but there is yet to be secured the active interest and practical help of the medical profession, especially general practitioners. *Summary of Work in 1925:* There came to the Bureau 141 ex-patients of sanatoria, 48 direct from sanatoria or other medical sources, 41 self-referred or attracted through publicity, 24 from welfare agencies, and 48 from interested friends or other applicants. Of all these, 50, or 35 per cent, were successfully placed or given training, and 16 found their own jobs. Of the 75 not placed, 37 were found to have active tuberculosis, mostly among the self-referred, while the others suffered from other disabilities. The placed patients earned, during the fifteen months' time on which this study was based, including board in some cases, over $41,000.—*Rehabilitation in Tuberculosis: Work of Placement Committee of the Boston Tuberculosis Association, J. B. Hawes, 2nd, Boston M. & S. J., September 16, 1926, cxcv, 567.*—(*A. P.*)

Rehabilitation of Discharged Sanatorium Patients.—The last few years in the antituberculosis campaign may be called the period of prevention. The inseparable and often very active mind within the diseased body must not be ignored. The normal convalescing individual hopes to return to economic and social responsibilities, and he must be assisted to do so as far as possible. Too often, through lack of medical supervision after discharge, the man again breaks down and must be rehospitalized. It has long been a practice at the Rutland Sanatorium to advise periodic examination either by the family physician or at the sanatorium. Thus reactivations of disease have been discovered, faulty habits corrected, and unfavorable pursuits discouraged. Approximately 50 per cent of patients with arrested disease place themselves, return to their occupation, and need no industrial rehabilitation. The other half constitute a real problem. One of the most faulty ideas held is that an outdoor occupation is necessary, although Lyman found that both factory and office workers held their condition better than outdoor workers. Physical hardship must be avoided. It must be impressed on patients that they must continue to "cure" after leaving the sanatorium and that spare time must for the most part be spent resting quietly. This requires stability of character. Courses of

instruction to patients while at the sanatorium are of great importance. Regularity of routine is to be sought, and patients must learn to conserve "vital forces and direct energy wisely." They must know the significance of undue fatigability. Industrial colonies have been of two types: (1) the colony proper, where trades are taught and residence is only temporary and (2) the industrial settlement, intended for those who are not expected to be able to return to industrial life elsewhere. Two famous English colonies are located at Papworth and Preston Hall. Nursing training schools have been started in this country for recovered women patients. The first was opened by the Phipps Institute in 1904, with White Haven Sanatorium and Rutland State Sanatorium following soon after. In New York City the Federated Jewish Charities has supported the Altro Work Shop for several years. The great value of sheltered employment, both economically and socially, has been slowly penetrating industrial circles. Three well-known organizations, the Metropolitan Life Insurance Company, the New York Telephone Company and the Standard Oil Company of California have been providing sanatorium and postsanatorium treatment. One able critic of industrial colonies (Menzies) believes the money required to run such establishments would be better spent on developing a good dispensary system with committees for after-care and assistance. The Boston Tuberculosis Association has recently (1924) created a placement bureau to aid discharged patients in securing employment. The attitude of the patient while in the sanatorium is a good guide as to his later course. The uncoöperative patient will probably not do well after he is placed. Rehabilitation begins when the patient is made ambulatory. At Rutland exercise and work are carefully prescribed and recorded on a treatment card, and checked up by the nurse, who watches for untoward symptoms. Many patients prefer remaining at the sanatorium indefinitely to returning to their former occupation, even though able. The percentage of tuberculous employees has varied from 50 to 65 per cent. Some of these employees have been in continuous service for periods of five to twenty-five, years, with results satisfactory to both themselves and the sanatorium. Since 1908 there has been a nurses' training school which for several years has been affiliating with general hospitals. There have been 104 graduates, including 20 head nurses at this and other sanatoria and 2 superintendents of nurses. It is felt that much has been accomplished in the way of rehabilitation.—*Rehabilitation of the Tuberculous with Special Reference to the Employment of Discharged Patients at the Rutland State Sanatorium, M. H. Joress, Boston M. & S. J., September 16, 1926, cxcv, 575.*—(*A. P.*)

Employment of Tuberculous.—The local phase of the problem of employment of tuberculous individuals, as met with in Great Britain, is discussed on the basis of the report of the Joint Tuberculosis Council. The subject is attacked more from the economic than the medical standpoint. It is noted that only 419 ex-patients are receiving employment in occupations which have been developed on business or commercial lines. This method of handling the problem has met with a high percentage of failures, and the expense involved is very high. Settlements and colonies for tuberculosis patients who are able to work is a more feasible plan. The financial success of such an undertaking depends largely on such factors as an assured market for the output, shortness of training period, simple machinery, and careful selection of foremen. Even with good financial returns, a subsidy is necessary. Such industrial centres are best established in connection with existing sanatoria. It is well to initiate the undertaking with the individual sanatorium as a nucleus on an unpretentious scale and develop gradually on a firm economic basis.—*The Employment of the Consumptive, J. Watt, Brit. J. Tuberc., October, 1926, xx, 157.*—(*R. S. A.*)

Urban Workshops for Tuberculosis Patients.—The Tuberculous Ex-Service Men's Society of Leeds has evolved a scheme for employment of the tuberculous, which, although unaided by either public or private funds, has not only been enabled to pay the employees a higher rate of wages than the average for the various industries, but in an annual turnover of $150,000 has realized a profit of more than $5,000. Those employed are generally of two types; namely, those in whom the disease is latent and those in whom it is slowly progressive or remittent. One hundred and twenty such men are employed. The scheme has had close cooperation between the doctor, the management and usually the patients. While the "village settlement" idea of employment is good, it is not the only scheme, for there must be advantages in disturbing as little as possible the environment and previous occupation of the patient, a condition that can usually be fairly well met in urban workshops, it being readily recognized that no one of any such schemes will completely

solve the problems of the return of the consumptive to employment. There should be a combination of the ideas employed in the several different institutions that are run for this same purpose. Patients must be treated individually, and individually suited to the work of their former occupation or something similar to it. Of all the schemes, that designed to teach farming to all patients is the least practicable, because the work is too heavy, the tuberculous patient is not allowed by law to handle milk, no farmer would employ such persons, and the remuneration is very poor. Such plans as the Papworth are excellent in many ways, but require too great capitalization, and the scheme that is to be put over as a national one must be relatively inexpensive in its operation.—*Urban Tuberculous Workshops, G. W. Allen, J. State Med., March, 1927, xxxv, 169.*—(*H. S. W.*)

Village Settlements.—As originally worked out, the "colony" was designed to teach the tuberculous patient, fresh from the sanatorium, a vocation. But in actual practice all it has meant has been merely a continuation of sanatorium treatment. Large numbers of ex-patients broke down a second time when they were returned to their former occupations. The tuberculosis convalescent is a damaged individual, and should in most instances not be returned to an environment that is likely to produce a relapse, but should rather be allowed to live a sheltered life in a village settlement, where light work is available for the shorter or longer hours it is deemed wise for him to work, and where hard, strenuous labor is taboo. Such is the Papworth Colony, where an effort is made to fit the worker to his task and, more important, to fit the latter to the worker. Behind the success of any such institution must be the physician, a hygienist, who can project himself, without resentment, into the home and community life of the workers and help adjust and balance disturbing factors, and who must touch all aspects of industry so as to evaluate properly the influence of this or that work upon the individual. The village-settlement idea has reëmphasized the fetish of the healthfulness of outdoor work, and has shown that open air can be provided inside factories and that certain forms of outdoor work are obviously too heavy and laborious for the consumptive. It has also shown that the sanatorium has its largest usefulness as a part of the settlement and not as an entity of itself. The sanatorium is usually filled with patients in whom a cure or permanent arrest is unlikely, and here rests the need and purpose of the village settlement that can provide the sort and the amount of work that such a patient may safely perform, and not cause him to be sent back into the hard daily grind of industry.—*Village Settlements for Tuberculous Workers, P. C. Varrier-Jones, J. State Med., January, 1927, xxxv, 34.*—(*H. S. W.*)

Specific Treatment of Tuberculosis.—Specific stimulants, derived from the tubercle bacillus, act in extremely small doses, and they may produce the formation of tuberculous tissue; in this way they differ from the action of nonspecific stimulants, such as protein bodies, chemotherapeutic remedies, metallic salts and arsenic, for example, which produce more active inflammatory changes in the tuberculous than in the healthy, but do not produce tuberculous tissue. However, tuberculins are not immunizing agents, and cannot be regarded as true antigens. According to Bessau, the hypersensitiveness to tuberculin depends upon the formation of so called tuberculocytes, through stimulation of the mesenchymatous tissues. Selter's explanation is that tuberculin is an irritant, causing inflammation of tuberculous tissue without being bound up with it. What really happens is the stimulation of the reticuloendothelial tissues. When the stimuli are not too strong, the resulting connective tissue penetrates and fibroses the tubercle. The degree of resistance to the infection is indicated by the degree of allergic response to stimulation by specifics. Increased allergic reaction is followed by improvement of the general health and of local foci, and all therapeutic measures must be condemned which tend to reduce hypersensitiveness to tuberculin. Only cases tending to fibrosis are suitable for specific therapy. The greatest caution must be exercised in cases which are predominantly exudative. The allergic behavior is most important in choosing the cases. If there is a strong allergic reaction, tested by the graduated Pirquet test, if the blood count is normal, if there is no fever and if the lesion is productive, then general remedies will suffice. When there is only a feeble allergic reaction, abnormal leucocyte counts and a tendency to fever, we are called upon to use specific remedies, but not, however, in cases in which there is pronounced exudation. Great caution is advised in attempting specific treatment in the secondary stages in children. As to the selection of specific remedies Koch's old tuberculin is somewhat too toxic. There is also B. E. and S. B. E. which have afforded the writer good results in hundreds of cases. Deycke and Much have done much research work on the use of the partial antigens.

A., F., and N., which have not been as helpful as old tuberculin. Recently the writer has been securing good results with the *Tebeprotin* of Toenniessen, a protein derived from tubercle bacilli and soluble in soda solution, used in weekly doses of from 0.0001 to 0.05 mgm. Recently attempts have been made to utilize the resistance of the skin to infection, by the introduction of stimulants subepidermally or percutaneously. *Ertuban* has been employed by Schilling in doses of 0.0001 to 0.001 mgm. Sahli has worked out a method of administering Beranek's tuberculin subepidermally, the doses being regulated by the allergic response. Percutaneous administration has taken the form of Moro's *Ectebin* and other tuberculin ointments. This method is appropriate in cases suitable for specific treatment in which exudation predominates. Although milder in its effects than the subcutaneous method, the dosage should nevertheless be cautiously increased. In Germany Ponndorf's method of rubbing concentrated old tuberculin into skin scarifications is widely adopted; but it should not be recommended because the dosage is uncertain and uncontrollable. In the matter of protective inoculations against tuberculosis, we can only be sure of immunizing by means of living virus. During recent years attempts have been made to immunize animals and children by means of weakened and nonpathogenic virus, such as Selter's vital tuberculin, Calmette's *BCG* and other vaccines. The value of these preparations has not yet been fully determined. Recently the writer has made experiments on the influence of splenic extracts on infected animals. Vaccines were produced, containing entirely nonvirulent tubercle bacilli, and rabbits were immunized with these against subsequent bovine infection. Protection followed for some months, and when infection eventually resulted there was a noticeable increase in resistance. The passive immunization of patients by means of serum has been attempted frequently, but it probably is not possible. Specific therapy under ambulant conditions might be possible if previously employed with benefit in sanatoria where all the necessary details have been observed.—*On Specific Stimulation Therapy and Protective Inoculation in Tuberculosis, G. Schröder, Tubercle, February, 1927, v, 213.*—(*G. L. L.*)

New Tuberculin.—This study is based on the experience of tuberculin treatment in two series of cases, including both sanatorium and dispensary patients, during ten years. The general conclusions regarding the value of tuberculin treatment are as follows: *1:* Tuberculin is of no value, and is indeed contraindicated in acute and active cases of pulmonary tuberculosis. *2:* Tuberculin *TOA* (filtrate) can safely be given in certain cases of a subactue type in which the temperature does not exceed 100°F., and is indeed not infrequently followed by beneficial results, as is indicated by lowering of the temperature to within normal limits. *3:* Tuberculin *BE* or *TR*, containing the body of the bacillus or its contents, is of value in ambulatory cases of pulmonary tuberculosis which do not react to the muscular movements of walking exercise and manual work. *4:* Tuberculin treatment induces complete healing in certain cases of nonpulmonary tuberculosis, especially those associated with a chronic discharging sinus. *5:* Tuberculin treatment rarely promotes complete healing in pulmonary tuberculosis, but if used for an extended period in suitable cases it tends to induce quiescence, to encourage fibrosis, and to confer some definite protection against relapse. The principles followed in the special method of preparing tuberculin proposed are: *1:* The preparation of a suitable culture medium containing sterile but unheated blood-serum of human origin for bacilli of human type and of bovine origin for bacilli of bovine type. *2:* The employment of a strain of human and bovine bacilli obtained from an acute or systemic type of the disease. *3:* The evolving from this, by culturing and subculturing, of a strain of tubercle bacilli which will grow actively on the media of human and bovine material before proceeding with the preparation of the tuberculin. *4:* Avoidance in the preparation of the tuberculin of any measures which are likely to interfere seriously with the character of the final filtrate. The general technique of the method recommended is as follows: *1:* The growth of the special strain of tubercle bacilli on a medium containing unheated blood-serum. The morphological, cultural, staining and pathological character of the bacilli and the toxic and infective characters of the filtrate to be investigated. · *2:* A subculture from *1* on a medium comprised of unheated blood-serum and an equal portion of the filtrate from *1*. A similar line of investigation to be carried out. *3:* A subculture from *2* on a medium comprised of unheated blood-serum and an equal portion of the filtrate from *2*. A similar line of investigation to be carried out. *4:* A subculture from *3* on a medium comprised of unheated blood-serum and an equal portion of the filtrate from *3*. The extent of subculturing will depend upon the growth obtained and the results of the investigations as to the character of the bacilli and the filtrates in the various subcultures. The

tuberculin, when completed, will consist of two portions: (1) the final filtrate, and (2) the final filtrate combined with an emulsion of bacilli from the final culture.—*A New Method of Preparing Tuberculin, H. H. Thompson, Brit. M. J., October 2, 1926, no. 3430, 587.*—(*B. T. McM.*)

Treatment of Tuberculosis with New Vaccine.—The hope of curing tuberculosis by passive immunization is a delusion. Many of the specific sera may exert a beneficial action upon the secondary changes occurring during the course of the disease, but they do not influence the fatal evolution of the tuberculous process. Many of the so called good results are due to a changed hygienic regimen and an altered mode of living, rather than to specific treatment. The author prepared a "serovaccine" for the treatment of tuberculosis. The serum was obtained from horses previously injected with tuberculous endotoxin, extracts of tuberculous lungs and tubercle bacilli killed with ether at 40°C. The serum was used as a solvent for the vaccine, which consisted of bacilli killed with ether at 40°C. and extracts of leucocytes. The results following the use of the serovaccine were not very decisive; so another preparation, called the "curative vaccine," was evolved. Live and virulent bacilli, finely suspended, were injected into animals. After 48 hours the bacilli were recovered, and on microscopic examination the bacilli were seen within leucocytes. Extracellular bacilli were rare. To facilitate disintegration of the leucocytes they were suspended in hypertonic solution and agitated with an excess of ether for 48 hours. Then enough distilled water was added to raise the hypertonic solution to 90 per cent. It was filtered through a thick layer of sterile absorbent cotton. This preparation is "Curative Vaccine, Grade 1." When injected into the body it produces an active immunization, and gives rise to an overproduction of antibodies, which neutralize not only the specific toxins but also the poisons of cellular origin. It thus exerts a direct influence upon the bacillus, which is finally encapsulated and slowly eliminated. It has been used on many patients and is perfectly harmless. Because of the high concentration of active principles its action is very powerful and rapid, for it is easily absorbed by the tissues. Beneficial results are not seen in every case. In the favorable cases, following the use of the vaccine, there is diminution of fever, night-sweats, cough, etc. The appetite returns, and general constitutional improvement ensues. Once immunization of the healthy tissues is established, regressive changes occur in the lesions. The "curative vaccine, grade 2" contains, besides the highly concentrated immunizing principles, another vaccine composed of pyogenic microörganisms isolated from tuberculous cavities. The efficacy of the vaccine is due to the association of cellular products and bacterial principles. Very little is to be expected of dead tubercle bacilli in the production of immunity against tuberculosis. This can be accomplished only by the use of living microörganisms. There is a wide difference between a vaccine prepared from artificially cultivated bacilli, killed by heat or chemical agents, and a vaccine prepared with bacilli and cellular products elaborated within a living body. The immunizing power of bacilli killed by ether is not altered as in the case of heat-killed bacilli.—*La vaccinoterapia nella tubercolosi, A. Bruschettini, Tubercolosi, August, 1926, xviii, 263.*—(*U. E. Z.*)

Inhalation of Vaccines for Secondary Infection in Tuberculosis.—Fever in tuberculous patients, especially in open cases with profuse expectoration, is often due to secondary infection. Vaccines against the secondary invaders have been given hypodermatically and intravenously, but the reactions following such procedures have many times been harmful. Administering the vaccines directly into the pulmonary system provokes a local as well as a general immunity. By means of a nebulizer, a polyvalent antipyogenic vaccine and the antipyogenic *Stomosine* of Centanni were introduced directly into the respiratory tree of patients in various stages of the disease. Far advanced cases in poor general condition were excluded. The dosage of the polyvalent vaccine was 1 to 4 cc. in 50 cc. of distilled water, and of the *Stomosine* 1 to 2 cc. in the same amount of distilled water. The inhalations were given every three or four days. Observations were made over a period of one and one-half years. There were very few thermal reactions following the vaccination. The temperature curve dropped to normal with varying rapidity, and remained at a normal level even after the treatment was discontinued. The expectorated material became less purulent and more mucoid. The amount of expectoration was diminished. The number of secondary microörganisms was diminished proportionately with the changes in the character of the expectoration. A general improvement was noted in these patients. In 5 cases of fetid bronchitis with bronchiectasis the fetid sputum decreased, and a drop in the formerly elevated temperature occurred. When the treatment was

discontinued, the fetid expectoration returned. With antipyogenic vaccination by inhalation, the fever in tuberculous subjects, incident to associated bacteria, can often be overcome when all other measures fail. The respiratory route offers a simple and practical method for such vaccination.—*Sull 'uso del vaccino e della stomosina antipiogene per via inalante contro le associazioni batteriche secondarie nella tubercolosi polmonare, L. Bottacin, Tubercolosi, September, 1926, xviii, 310.*—(*U. E. Z.*)

Treatment of Tuberculosis with Living Tubercle Bacilli.—In 15 patients with tuberculosis therapeutic doses of virulent tubercle bacilli were given intracutaneously. Doses of 100,000 bacilli were rubbed in at each treatment, which occurred every two weeks for one and a half years. The patients did well and felt subjectively improved, the weight improved, night-sweats lessened or disappeared, the sputum became decreased, roentgenograms showed improvement, râles lessened, and areas of impairment cleared. There were no acute reactions or rise in temperature from the inoculations. "Heterologous methods" (use of nonpathogenic acid-fast bacilli) confer no immunity, and only the homologous methods (human bacilli, and these must be alive) give immunity. The ideal homologous method would be intravenous inoculation of the patient. It was used on two patients, but it is dangerous. Subcutaneous inoculation is objectionable because of the formation of abscesses; the "feeding" method is too often without effect and in children might cause lymphatic disease. Intracutaneous infection is the method of choice, because clinically tuberculosis of the skin seems almost invariably to confer immunity to "internal" tuberculosis. Besides this, if results should not be favorable, the areas may be disinfected or excised. The method will lend itself to immunizing of infants.—*Aktive Immunisierung gegen Tuberkulose durch intrakutane Einreibung Tuberkelbazillen, A. Moeller, Deutsche med. Wchnschr., September 24, 1926, lii, 1647.*—(*H. S. W.*)

Treatment of Tuberculosis with Living Tubercle Bacilli.—It is conceded that cutaneous tuberculosis exerts a favorable influence upon internal tuberculosis and *vice versa*. In an effort to treat cutaneous tuberculosis by the establishment of new foci, the following method was employed: In 14 patients with cutaneous tuberculosis, two of whom also had pulmonary involvement, living virulent human tubercle bacilli were inoculated intravenously at intervals of eight to fourteen days with doses of 3,000, then 12,000 and finally 20,000 bacilli, the inoculations extending over a period of seven months and the total dosage amounting to 500,000 bacilli. The bacilli were administered in the form of a vaccine. The inoculations led to no general or local reactions, even in the two patients with pulmonary tuberculosis. One of the latter died, but death followed several months after the last injection and could not be attributed to the inoculated bacilli. No essential change could be demonstrated as a result of the treatment, but this was so probably either because the dosage was too small, or the vaccine was not always fresh, or the intracutaneous method is not the ideal method. The experiment at least demonstrates the harmlessness of the method.—*Ueber intravenöse Einverleibung virulenter Tuberkelbazillen zur Beeinglussung von Haut- und Schleimhauttuberkulose, P. Wichmann, Deutsche med. Wchnschr., January 14, 1927, liii, 110.*—(*H. S. W.*)

Treatment of Experimental Tuberculosis with Apathogen.—Two guinea pigs, treated with *Apathogen* and infected with freshly isolated tubercle bacilli, remained free from tuberculosis, while guinea pigs treated with other nonpathogenic bacilli, and *Lipatren* alone or in combination, or with "organ lipoid" and "lipoid mixture," became markedly diseased. Tuberculous guinea pigs, treated with 0.5 cc. of tuberculin mixed with one-half loopful of *Apathogen*, which mixture had remained at room temperature two hours before use and was then injected subcutaneously, survived, while similar animals treated with tuberculin alone died in 24 hours.—*Tuberkulose und Apathogene, H. Much, Beitr. z. Klin. d. Tuberk., 1926, lxii, 665.*—(*H. J. C.*)

Treatment of Tuberculosis with Tasch.—Good results were obtained in 38 patients treated by the peroral method with Tasch (tuberculin-antigen-Scheitlin), a preparation consisting of old tuberculin combined with antituberculosis serum, tuberculotoxin and antitoxin prepared according to a modified method of Behring, together with guaiacol sulphate.—*Bericht über die Erfahrungen mehrjähriger Behandlung mit Tasch (Tuberkulin-Antigen-Scheitlin, Basle), G. Gruber, München. med. Wchnschr., December 3, 1926, lxxiii, 2075.*—(*E. R. L.*)

Treatment of Pulmonary Tuberculosis with Auto-Serum and Blood.—Previous results in the treatment of tuberculosis by injection of the patient's own blood seemed to demonstrate a favorable

influence, but were not sufficiently extensive to be conclusive. More recent results show that previous reports were too optimistic. One hundred patients with various types of pulmonary tuberculosis received, in all, more than 2,000 injections of their own blood. In some instances defibrinated blood was injected, and in other cases only the serum. Injections were intravenous, subcutaneous and intracutaneous. Freshly defibrinated blood was found to have a strong stimulating action. Whether or not this will prove favorable remains to be seen, but present results justify further trial. Serum and old defibrinated blood were proved to be without action on the course of pulmonary tuberculosis.—*Ueber Behandlung der Lungentuberkulose mit Eigenserum und Eigenblut, W. Peus, München. med. Wchnschr., January, 14, 1927, lxxiv,* 60.—*(E. R. L.)*

Treatment of Surgical Tuberculosis with Animal Serum.—Normal foreign sera, for instance, horse serum, injected into patients with bone and joint tuberculosis, act as nonspecific irritants stimulating the body to the formation of defensive substances. Serum and defibrinated blood are of equal value. A favorable effect is shown in the Pirquet reaction, which in several patients was seen to become positive where previously negative on account of a cachectic state. Nothing is gained by injection at the site of the disease, as it is the general reaction which is of value. Four case histories showing improvement on injection of horse serum are recorded.—*Zur Behandlung der chirurgischen Tuberkulose mit Tierserumeinspritzungen, J. Oeder, München. med. Wchnschr., February 11, 1927, lxxiv, 240.—(E. R. L.)*

Treatment of Tuberculosis with Splenic Extract.—The physiological basis of the treatment of tuberculosis by splenic extract is established by the fact that such therapy brings about quickly, both in experimental animals and in human patients, all the changes observed in the transition from active disease to cure. These include an increase of red blood corpuscles, frequently from 3,800,000 to 5,000,000 per cu. mm., with a corresponding increase in hemoglobin, an increase of leucocytes, especially of the lymphocytes and eosinophiles, a diminished elimination of phosphates in the urine, a development of fibrous tissue about the lesions, and a decrease in the number and the final disappearance of tubercle bacilli from the sputum. The experimental basis for splenic therapy is obtained from personal experiments and the work of Schroeder and others, which showed that (1) a certain number of treated guinea pigs survived, and those that died lived longer than the controls, (2) the lesions in the treated group were more chronic and fibrotic in nature, while those of the controls were more rapidly progressive, and (3) the loss of weight was less rapid and the red blood corpuscles were more numerous in the treated animals. The clinical basis for the use of splenic extract is found in the rapid appearance in treated patients of the favorable changes previously enumerated. In lesions of the first degree physical examination reveals marked improvement after one month, and in a few months such cases may be considered as cured. Lesions of the second degree, excluding cases with cachexia and hectic fever, are also favorably influenced, but require longer treatment. Expectoration from cavities is diminished, and the latter tend to cicatrization and drying up. Cases of surgical tuberculosis are also benefited by splenic extract. The technique of treatment varies according to the form and severity of the disease and the age of the patient, but as a rule 12 subcutaneous injections of 5 to 10 cc. of extract of pig's spleen may be given to an adult in twenty-one days, in addition to four tablespoons of syrup of the extract daily by mouth. The course is repeated after eight days' rest, and the treatment is continued for several months after cure. Emphasis is laid on the simultaneous application of the classical measures of proper diet, fresh air and rest. Results given in 1913, for cases of pulmonary and osteoarticular tuberculosis treated by splenic extract, showed 100 per cent of cures in disease of the first degree, and 75 per cent of cures in all cases of pulmonary tuberculosis. These results have been confirmed in other clinics and many cases of the first report remain in good health.—*L'opothérapie splénique traitement de choix de la tuberculose, Bayle, Presse Méd., September 23, 1925, no. 76, 1266.—(E. H. K.)*

Surgical Treatment of Pulmonary Tuberculosis.—In most European countries, and to an increasing extent in America, the operative treatment of certain classes of cases of phthisis and bronchiectasis has been widely accepted. *Methods of Treatment: Division of adhesions:* The method of choice is the cauterization of adhesions under the control of thoracoscopic vision, as devised by Jacobaeus. This operation is used in cases in which artificial pneumothorax treatment is only partially successful, owing to the presence of localized adhesions which prevent full pulmonary collapse. During artificial-pneumothorax treatment, when a definite

cavity is held uncollapsed by a fine adhesion, and the temperature, pulse-rate and sputum are increased, the operation is advisable. The operation should not be attempted in the presence of pleurisy nor with bands of greater thickness than 1 cm. Empyema is the most severe complication and may occur either early or late. *Pneumolysis:* This operation is done to produce a localized collapse of the lung in order to compress cavities. The best results have been obtained in apicolysis secondary to thoracoplasty, in which a residual cavity has remained at the apex. *Phrenicotomy:* Simple division of the phrenic nerve in the neck is not always followed by diaphragmatic paralysis. This is due to the presence of accessory phrenic fibres which join the main stem after its entrance into the thorax. This anomaly occurs in from 30 to 40 per cent of the cases. *Thoracoplasty:* Indications for thoracoplasty in tuberculosis are fibrotic disease with mediastinal displacement; cases in which artificial pneumothorax has been successfully carried out but in which reactivation results when the treatment is given up; cases of long-standing disease with extensive cavitation; recurrent pleural effusions; true tuberculous empyema unassociated with secondary infection. In all cases the disease must be mainly unilateral. In patients under 14 years of age thoracoplasty is inadvisable, because in the contracting fibrotic type of disease the chest wall naturally tends to fall in. Advanced lesions of the cardiovascular system constitute a contraindication except when cardiac embarrassment is due to mediastinal displacement. Lesions of the intestine, kidneys, bones and joints are generally accepted as contraindications. In bronchiectasis the disease must be unilateral. Physical signs are often indefinite, and X-ray evidence may be very doubtful. The introduction of lipiodol into the bronchi will generally show whether the disease is unilateral or bilateral. Alexander has collected all the results of thoracoplasties for tuberculosis published in the period 1918 to 1925. There were 1,159 operations by 53 surgeons, and 57 per cent of the patients showed improvement or were "cured." All of these were far advanced and were becoming worse in spite of sanatorium treatment. *Summary:* 1. Thoracoscopy and cauterization of adhesions are valuable aids to artificial pneumothorax, especially in cases in which cavities are prevented from collapsing by band-like or string-like adhesions, not thicker than 1 cm. The number of cases is comparatively small. 2. Pneumolysis can be used as an independent procedure or as supplementary to other operations; it is of no use in bronchiectasis, in which basal collapse is required and there is no point of counter-pressure. It is most valuable for uncollapsed apical cavities following thoracoplasty for tuberculosis. Fat appears to be the ideal medium if enough can be obtained. As an independent procedure the results are not satisfactory as the collapse is too localized. 3. Phrenicotomy, or rather radical phrenicotomy, is of value, as an independent procedure, occasionally in the more acute forms of phthisis, in which major operations are contraindicated, and in early and, on the worse side, in bilateral bronchiectasis. It is of value as a test of the activity of tuberculous disease in the so called "better" lung previous to thoracoplasty. As a supplementary procedure it is useful in cases treated by artificial pneumothorax, either when diaphragmatic adhesions are present, or, by reducing the capacity of the hemithorax, it may prevent reopening of cavities when the lung is allowed to expand at the end of pneumothorax treatment. Supplementary to thoracoplasty, it is of much value when the compression of the major operation is found to be insufficient. Hemoptysis from basal cavities can sometimes be controlled by this operation. 4. Thoracoplasty offers considerable hope of amelioration or actual cure in chiefly unilateral tuberculosis of the lung, when artificial pneumothorax is impossible or unsatisfactory, and when the disease is progressing in spite of careful medical treatment. It is of use also in cases of tuberculous empyema without secondary infection. In septic tuberculous empyema the results are not good, but the disease is otherwise almost invariably fatal. Considerable improvement, amounting to cure in some cases, can be obtained by thoracoplasty in unilateral bronchiectasis, but this operation will not collapse the larger bronchi near the hilum, and in some cases a nonodorous mucoid sputum remains after the operation. 5. Pneumonotomy should be reserved for localized tuberculous abscesses which are not draining well through the bronchus, and in cases in which the generalized tuberculous process appears to be inactive. In bronchiectasis it should be used only in those cases of large localized abscess formation, and not in the diffuse variety. 6. Bronchostomy is occasionally of great value following drainage of large abscesses; a partial plastic operation on the chest wall should be performed subsequently. 7. Pneumonectomy appears to be almost totally contraindicated in phthisis. In bronchiectasis, although apparently the ideal procedure, it is followed at present by an almost prohibitive mortality (50 per

cent). Further improvements in the technique may eventually make it the operation of choice. The more recent cautery pneumonectomy, as practised by Graham in America, has been followed by a much lower mortality than any other lobectomy operation, and offers reasonable hope of eradication of the septic lobe.—*The Surgical Treatment of Phthisis and Bronchiectasis, A. T. Edwards, Brit. M. J., January 1, 1927, no. 3443, 9.*—(*W. I. W.*)

Air Embolism Complicating Thoracic Surgery.—Complications that may arise during or after the procedure of artificial pneumothorax are air embolism, emphysema, pneumoperitoneum, pulmonary hemorrhage, spontaneous pneumothorax and pleural effusions. Air embolism is probably the most alarming and the most to be dreaded of these complications. Air may reach the systemic circulation if the needle enters a blood-vessel in pleural adhesions or the lung itself, especially if this be consolidated. A condition, rarely encountered, is one in which air may enter the terminal coronary vessels producing cardiac failure, or cardiac failure may result from circulatory disturbances around the floor of the fourth ventricle. Ten cases of air embolism are reported: (1) in 7 of the 10, the patients were either in the sitting position or were attempting to arise from the table when the symptoms of air embolism became manifest; (2) in 40 per cent symptoms appeared without the actual introduction of air; (3) in 4 cases nausea was the initial symptom; (4) in 7 cases the patients complained of very severe pain at the site of the operation; (5) in 6 cases tonic and clonic convulsions were a prominent feature; (6) in 6 cases there were mild to severe visual disturbances; (7) six of the patients became totally unconscious; (8) nine of the 10 cases showed evidence of pleural adhesions in the roentgenogram. Treatment may be divided into prophylactic and therapeutic. *Prophylactic:* Study of the roentgen-ray and fluoroscopic examinations, with special note of areas of consolidation, adhesions and cavitation near the periphery of the lung, will serve to guide one away from the dangerous areas of the lung. *Therapeutic:* The head of the patient should be at once lowered to an angle of about 30 degrees. Circulatory stimulants, such as epinephrin and strychnine, have been found to be of value. In cases of respiratory failure it may be necessary to resort to artificial respiration. Apply heat to the extremities to combat the shock. The head of the bed should be kept lowered for about half an hour after the effects of the air embolus have passed away. *Summary: 1:* Cases of air embolism are more frequent than one would be led to suspect by reviewing the literature; and it is believed that those cases reported as pleural shock are in reality mild cases of cerebral air embolus. *2:* Cerebral air embolism may result from injecting air into the pulmonary veins or dilated veins in the parietal pleura, adhesions or chest-wall. In the latter the air reaches the pulmonary veins by the venous anastomosis along adhesions. *3:* This accident may occur also without actually introducing air, the air being aspirated into the vein from the needle and connecting tube, from the pleural cavity, or from the air spaces in the lung, or by direct passage from the left to the right heart by way of a patent foramen ovale. *4:* The symptoms and signs of cerebral air embolism are nausea, pallor, pain at the site of operation, tonic and clonic convulsions, visual disturbances, coma, passing manic-depressive manifestations, retrograde amnesia, visible air bubbles in the central retinal vessels on ophthalmoscopic examination, and mottling of the skin. *5:* It is important to keep the head of the patient lowered for at least ten minutes following the withdrawal of the needle, if symptoms or circumstances indicate the possibility of the occurrence of air embolism. *6:* Prophylaxis consists of careful study of the case by roentgen-ray and fluoroscope before operation, the use of a large calibre needle with blunt point, free and negative manometer oscillations before the introduction of air, removal of needle as soon as the patient shows any signs or symptoms of air embolism, keeping the patient in the prone position for at least ten minutes after withdrawal of the needle, if study of the case reveals the possibility of the occurrence of an air embolism. *7:* In treatment, one should lower the head immediately, administer epinephrin or strychinine, keep the head of the bed lowered for about half an hour after symptoms of air embolism have disappeared, employ artificial respiration, and, in cases of coronary air embolism or of cardiac failure, inject epinephrin directly into the heart, and massage the heart muscle directly or indirectly.—*Air Embolism Complicating Thoracic Surgery, G. W. Reyer and H. W. Kohl, J. Am. M. Ass., November 13, 1926, lxxxvii, 1626.*—(*W. I. W.*)

Indications for Artificial Pneumothorax.—Since the time of Forlanini, the conceptions regarding tuberculosis have been profoundly altered, and the principles laid down by him for pneumothorax therapy have also undergone striking modifications. Because of this the guiding factors in determining and carrying out a therapeutic

pneumothorax must be based upon more recently acquired knowledge. The modern technique of low pressures in artificial pneumothorax is the direct result of practical observations. A positive pressure is not necessary, and is even useless to obtain complete pulmonary collapse. The ideal pneumothorax is the one that can be maintained with the lowest pressures. Therapeutic pneumothorax is most efficacious only in early tuberculous lesions, and particularly in those of the exudative type, in which fibrosis occurs late and only to a small degree. Compression, to be most effectual, must be applied to the greatest portion of the lung in which the terminations of the vagus nerve are found, and especially to the alveoli around the lesion. There can be no objections to an early pneumothorax. Complications should not be feared. The majority of them are due to errors of the operator. *Conclusions:* In the face of classical indications, pneumothorax is a procedure which causes a marked modification of symptoms. It is a definite method for absolute cure, clinically and anatomically, if applied to all cases of parenchymatous pulmonary tuberculosis at its very incipiency. If carried out early it will prevent local and general pulmonary sclerosis, and will favor the formation of a retractile scar. It will prevent the formation of pleuritic adhesions, especially those at the diaphragm which impede the dynamic action of the heart, obstruct the pulmonary circulation, and favor further sclerosing processes. The complications incident to pneumothorax, if instituted when the pulmonary lesions are advanced and the course of the disease is febrile, will be less marked with early intervention.—*La guista indicazione del pneumotorace terapeutico, F. Parodi, Tubercolosi, October, 1926, xviii, 337.*—(*U. E. Z.*)

Artificial Pneumothorax of Both Lungs at Different Times.—A case of pulmonary tuberculosis of the right lung, with cavity, in a patient 17 years of age, was treated, with improvement, by artificial pneumothorax. This resulted in disappearance of the tubercle bacilli, and four months later the left side developed small cavities and tubercle baciili again appeared. Three months later, after discontinuing the right pneumothorax, the latter was instituted on the left side with beneficial results.—*Ein Fall von erfolgreicher Pneumothorax-Behandlung beider Lungen in zwei Seiten, W. Schultz, Beitr. z. Klin. d. Tuberk., 1926, lxiii, 627.*—(*H. J. C.*)

Hemostatic Artificial Pneumothorax.—Only temporary benefit can be expected in hemoptysis with all agents supposed to increase the coagulability of the blood. Respiratory movements and cough impede proper and lasting cicatrization. To obtain perfect compression of the bleeding vessels, an emergency artificial pneumothorax is theoretically ideal. However, in actual practice a perfect result is not always obtainable. The indications for artificial pneumothorax are definite, but in the face of severe or repeated hemorrhages the guiding criteria must be waived, and pneumothorax must be instituted as an emergency measure. In these cases it cannot be expected that the procedure will always be of great benefit to the pulmonary lesion, although in a large percentage of cases a pneumothorax instituted for hemorrhage may be continued and may, perhaps, produce a general betterment. Artificial pneumothorax is the best and only treatment for protracted hemorrhages. Hemoptysis is due to vascular injury, and no drug will give as secure a result as will collapse therapy. The only contraindication to the induction of pneumothorax for bleeding is a tenaciously adherent pleura, and in these cases there remains the operation of Sauerbruch.—*Pneumotorace emostatico, T. Mario, Tuberculosi, November, 1926, xviii, 379.*—(*U. E. Z.*)

Posture in Artificial Pneumothorax.—Intrathoracic pressure varies with posture in cases of artificial pneumothorax. If the patient lies on the pneumothorax side the weight of the viscera will render the intrathoracic pressure in the pneumothorax cavity higher than if he lies on the healthy side. It is possible, therefore, to use posture if we wish to stretch adhesions, for by making the patient lie on the healthy side a continual drag on the adherent areas would be produced. Posture will affect the intrathoracic pressure more when the lung is free than in cases in which it is bound to the chest-wall by adhesions. It will also have a greater effect if the mediastinum is freely movable.—*The Effect of Posture on Cases of Pneumothorax, L. S. T. Burrell, Brit. M. J., January 22, 1927, no. 3446, 135.*—(*W. I. W.*)

Pleural Effusion in Artificial Pneumothorax.—This is the most common complication of artificial pneumothorax. In this discussion very small transitory effusions are excluded, and only those cases are considered in which the fluid at least covers the diaphragm and lasts more than a week. Of 309 consecutive successfully induced pneumothorax cases with pulmonary tuberculosis, effusions occurred in 41.4 per cent, and 36.7 per cent of these are dead, as

compared to 31.5 per cent of the cases without effusion. In about 72 per cent of the fluid cases the effusion remained clear, and of these 29.4 per cent are dead, as compared to 55.6 per cent of cases with tuberculous empyema. Roughly speaking, the figures show that cases which develop clear pleural effusion do neither better nor worse than "dry" cases, but that the appearance of tuberculous empyema makes the outlook much graver. The cases are further classified according to contralateral involvement, and show that those which were clinically unilateral obtained about twice as good results as those with slight contralateral involvement, and the latter more than twice as good results as cases in which the contralateral involvement exceeded one-third of the lung. In Burrell's series the great majority of effusions developed in the first six months of treatment and but rarely after the first year. These effusions are true tuberculous exudates and appear to be uninfluenced by external factors. Tubercle bacilli are not at first usually found, but in long-standing effusions they can almost always be demonstrated, unassociated with any other microörganisms. Artificial pneumothorax in nontuberculous disease is rarely complicated by effusion. Treatment depends on many factors. If the fluid is left alone it will usually cause obliteration of the pneumothorax cavity by pleural adhesions and fibrosis, starting at the bottom and working upward. If the fluid is not removed the patient must be carefully observed, and if symptoms of pressure or mediastinal displacement occur aspiration must be performed. If it is deemed important to continue pneumothorax fluid must be aspirated at each refill. In replacing fluid by air or gas a much smaller quantity of the latter is required. It is also best to use two needles in order to keep a constant control of the intrapleural pressure and maintain it at the level desired. If the fluid is purulent the case is much more serious. The pus should be aspirated and the intrathoracic pressure kept as low as possible to help the lung reëxpand. Lavage with saline solution may be tried, as well as injection of some modifying fluid to render the pus more liquid, and of formalin and glycerine, but the outcome is the same. The best chance for the patient is an early thoracoplasty. Purulent effusions in spontaneous pneumothorax offer an even more serious outlook. Here they are the rule. Of 18 spontaneous pneumothorax cases with fluid, 13 are dead and only 2 have done well, whereas all 4 of those without effusion did well. In spontaneous pneumothorax thoracoplasty should also be considered early.—*Pleural Effusion Complicating Pneumothorax, L. S. T. Burrell, Brit. M. J., July 3, 1926, no. 3417, 8.*—*(A. P.)*

Tubercle Bacilli in Effusions in Artificial Pneumothorax.—Tubercle bacilli were found in 13 per cent of 247 specimens of pleural effusion. There were 57 that had come from chests undergoing artificial pneumothorax and 25 per cent of these contained bacilli, leaving a percentage of only 9.8 for the other specimens. The withdrawal of fluid in artificial pneumothorax, with its disturbance of old adhesions, etc., may be responsible for the increase in incidence of bacilli in such fluid over that of spontaneous effusions. Such patients are always more liable to extraneous infection and their "resistance" is lower. A larger material than this should be gathered and studied, to determine whether there may be danger in withdrawing the fluid that forms in the presence of pneumothorax.—*Ueber das Auftreten von Tuberkelbazillen in Exudaten nach Anlegung des künstlichen Pneumothorax, O. Ornstein, Deutsche med. Wchnschr., February 14, 1927, liii, 239.*—*(H. S. W.)*

Pleural Fibrin Flakes in Artificial Pneumothorax.—Two cases are reported in which fibrin flakes were found in the pleural space after the institution of artificial pneumothorax. These flakes were free and caused no particular symptoms. Their origin is attributed to small hemorrhages at the site of needle puncture in the pleura.—*Fibrinkugeln im Pneumothoraxraum, J. Klinkowstein and N. Belajewa, Beitr. z Klin. d. Tuberk., 1926, lxiii, 313.*—*(H. J. C.)*

Signs of False Consolidation in Contralateral Lung in Artificial Pneumothorax.—Two cases are reported, and physical signs and changes are described in detail. *Summary of Changes:* Toward the base of the "sound lung," the appearance of bronchial breathing and pectoriloquy, without percussion changes in one case; in the other, with slight dulness. On the patient placing his arm on his head the bronchial breathing disappeared and was replaced by vesicular murmur. This phenomenon was also observed in a case of exudative hemorrhagic pleurisy. *Case I:* A young man of thirty years; thorax long and narrow. Bronchial breathing on the right side was clear and occupied a space of a 5-franc piece. X-ray showed a diffuse thick opacity, occupying two-thirds of the left pulmonary field and its upper limit characteristic of a pleuritic exudate. Heart and trachea were moderately displaced to the left. Right

pulmonary field appeared normal. Exploratory puncture showed a hemorrhagic and lymphocytic exudate. Five days after admission the bronchial breathing on the right disappeared and never returned. The patient made a good recovery. What does such localized bronchial breathing on the opposite side signify? One may consider (1) the propagation of sounds from the compressed lung (2) a pneumonic focus, and (3) compression of the right lung itself. Against the first supposition is the fact that between the spinal column and an area of bronchial breathing was heard normal vesicular murmur. It seems most probable that the bronchial breathing was the consequence of a compression. The displaced heart and mediastinum collapsed the right lung, aided by the narrowness of the thorax, and produced an artificial condensation; on raising the arm the hemithorax enlarged, the lung being able to occupy more space. Hence the artificial condensation disappeared. *Case 2:* A man of twenty-three, with well-marked symptoms of pulmonary tuberculosis and poor general condition. The X-ray showed an obscurity of the inner half of the right apex, with no illumination after cough. The whole right pulmonary field showed a fine marbling, with deep cloudy mottling. In the middle third of the left pulmonary field was some disseminated mottling. Clinical indications being those of progressive disease, a right artificial pneumothorax was performed. After the fourth insufflation the collapse of the lung was almost complete, and symptomatic improvement was remakable. There was, however, noted in the left axillary region, especially below, slight dulness, tubular breathing and subcrepitant, somewhat consonating râles; also definite pectoriloquy. On making the patient raise his left arm over his head, the bronchial breathing and consonating râles disappeared, and were replaced by harsh vesicular breathing and subcrepitant, nonconsonating râles. The percussion sound became normal. After the following reinsufflations the bronchial breathing failed to disappear even after raising the arm, but became softer and weaker. Insufflations were discontinued for nineteen days because of the possibility of an aggravation of the left pulmonary process. The breath-sounds then lost their harsh, tubular character, and became softer and more vesicular. After renewed insufflations the breath-sounds in the left axilla again became bronchial, but disappeared on raising the arm. Both heart and mediastinum were displaced toward the left. The radiographic picture demonstrated in the lower third of the left pulmonary field quite a well-marked shadow when the arm was lowered. On its being raised this shadow cleared somewhat, and there were visible disseminated mottled areas. The same change was visible under the fluoroscope, where, on raising the arm, one could see the hemithorax dilate and the intercostal spaces become larger. The evidence appears to show that the physical signs on the left side did not correspond to progressive anatomical lesions. In this case also a compression from the opposite side appeared to produce an artificial condensation. Here, however, the presence of consonating râles and slight dullness indicated the presence of small foci of infiltration, which became agglomerated by the compression, and simulated a vast infiltration. From these 2 cases it is concluded that the signs of condensation, which appeared in the lung opposite to that under compression, are not always the expression of anatomical lesions. They may be the consequence of a compression, which takes place through the intermediary of the heart and mediastinal organs. In such cases, raising the arm on this side over the head causes changes in the physical signs, such as described. It has never been observed in cases of true infiltrations that the bronchial breathing and consonating râles change in character on raising the arm.—*Signes de fausse condensation dans la poumon oppose à celui qui se trouve sous une compression, Y. Nedelkowitch, Rev. d. l. Tuberc., December, 1925, no.* 6, *749.—(A. P.)*

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